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1 May 1962

MEMORANDUM FOR : Chief, Development Branch, DPO

SUBJECT : Outstanding Items - Increased Scope GECART  
Engine Development Program

1. Attachment I presents a resume of proposals and actions taken to accelerate subject program. Three outstanding proposals which have not yet been implemented are:

- a. Compressor rig/engine interchangeability.
- b. 2nd Alternate (Mod IV) Turbine.
- c. Weight reduction.

2. New inputs received from Pratt & Whitney. Presently compressor rigs are fabricated with steel parts which are neither interchangeable in part nor in whole with the engine. All data showing performance improvement on rigs must be verified by engine test. With the present steel rig configuration, three to four months lead time is expended in converting rig parts to engine parts after each preceding rig test. Interchangeability between rig and engine would permit direct incorporation of the rig assembly as a whole into an existing engine assembly thereby eliminating the 3 to 4 months now expended. With the present compressor performance program underway directed toward reducing existing engine take-off performance deficiency as well as improving cruise performance indirectly which involves much rig to engine evaluation of increased gap/chord and honeycomb/solid shroud designs, it is recommended that this rig/engine interchangeability be implemented immediately.

3. Attachment II presents an historical summary of turbine modifications. Item 8 which is the Mod IV has been proposed as the final improved performance modification to supersede the Mod III structural modification. Pratt & Whitney estimates a 1% performance improvement which is said to be tantamount to 100 lbs. engine and fuel weight. If this 1% improvement is realized as indicated by design study, the Mods III and IV combined will reduce effective engine and fuel weight by 165 lbs. with a stronger blade root than the presently existing Mod I. In view of a reduction in cost for

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Mod IV from [ ] and the emergence of Mod III as a superseding rather than a backup design which now eliminates the Mod V narrow axial disc worth 165 lbs. saving, it is recommended that the Mod IV turbine seriously be considered in addition to the now implemented Mod III. Based on development alone (excluding parts and retrofit) the effective 100 lbs. saving of Mod IV breaks down to [ ]

4. An estimated weight reduction of 90 lbs. appears feasible by replacing steel second and third stage compressor parts with titanium. Development by engine testing will require according to Pratt & Whitney 6 engine sets of parts at a cost of [ ] [ ] With these 6 sets, Pratt & Whitney estimates flight clearance by June 1963. At this point in time present scheduling dictates AA engines delivered indicating retrofit back into the 30 CMCART engines. Total cost therefore must reflect retrofit as well as parts and development. Based on development alone, the 90 lbs. saving if realized breaks down to [ ] Recommended serious and timely consideration in view of long standing emphasis on vehicle performance.

SIGNED

[ ]  
Development Branch  
DPD

Attachments:  
As stated

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